IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Payne	Attorney Docket No.: NSC1P292/P05784
Application No.: 10/758,759	Examiner: Blevins, Jerry M.
Filed: January 15, 2004	Group: 2883
Title: HYBRID WAVEGUIDE	Confirmation No. 6398

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Signed: /Laura M. Dean/
Laura M. Dean

PRE-APPEAL BRIEF - REQUEST FOR REVIEW

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The Applicant hereby requests review of the rejections in the above-identified application. This request is being filed with a Notice of Appeal. The review is requested for the reasons stated below.

In the Office Action dated June 8, 2007 the Examiner rejected claims 1-3, 5-12, 14-20 and 22-24 under rejected under 35 USC 102(b) as anticipated by Sugama (US Patent Publication 2002/0118907) and claims 4, 13 and 21 were rejected as obvious over Sugama and Nakamura (US Patent 5,604,835). As the claims have been rejected at least two times, the Applicant is entitled to file the current pre-appeal brief. Claims 1-24 remain at issue.

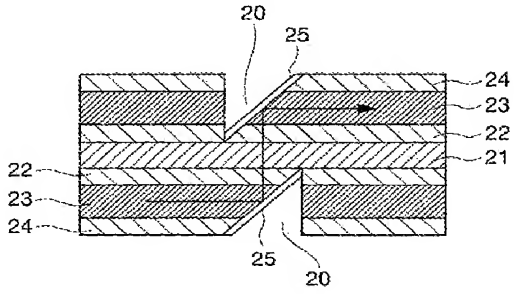
ARGUMENTS

Claims 1 and 18 recite a top cladding layer that is ***patterned*** so that a ***substantial portion of a plurality of optical lenses*** formed on the bottom cladding layer and positioned in the optical path of the core channels ***are exposed to ambient air respectively***. None of the many embodiments of Sugama, including those relied on by the Examiner (i.e., Figures 16G, 16H and

23), teach or suggest the patterning of a top cladding layer so that a substantial portion of the underlying optical lenses are exposed to ambient air.

Although not relied on by the Examiner, it is useful to review Figure 15 of Sugama before addressing the rejection. Figure 15, reproduced below, shows upper and lower optical waveguides mounted onto a substrate 21. See paragraph [0175]. Each waveguide includes three layers, including under cladding layer 22, core layer 23, and an over cladding layer 24. See paragraph [0176]. Grooves 20 are formed in each waveguide. A metal reflective surface 25 is provided on the incline surface of each groove. See paragraph [0177]. As a result, optical communication may occur from the bottom core 23, off the two reflective surfaces 25, to the core 23 of the upper waveguide, as designated by the arrow shown in the figure.

FIG. 15



Figures 16A-16H and paragraphs [0179]-[0185] show and describe a sequence of fabrication steps for making the upper and lower waveguides used in the structure of Figure 15. In paragraph [0184], Sugama describes using a laser to form the groove 20 in each waveguide. In paragraph [0185], a gold film 28 is sputtered onto the inclined face of the groove 20, which presumably is the same as the reflective surfaces 25 illustrated in Figure 15.

FIG. 16G

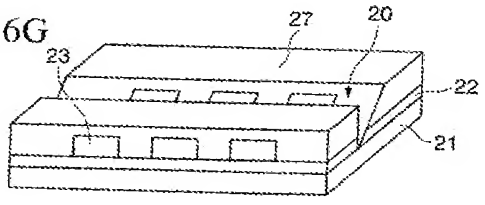
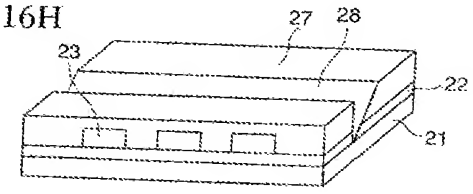


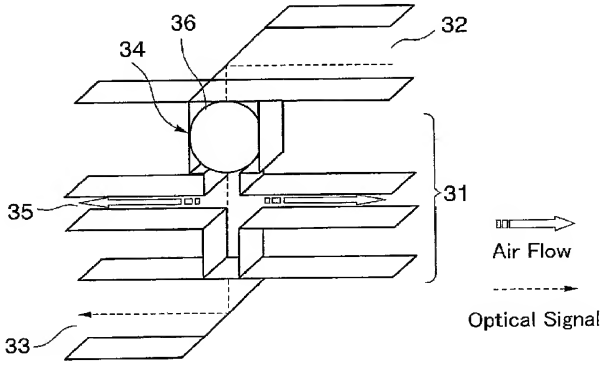
FIG. 16H



In the embodiments illustrated in Figures 15, 16G and 16H of Sugama, there are no (i) **plurality of optical lenses formed on the bottom cladding layer**. Accordingly, the top cladding layer of Sugama is not patterned **so that a substantial portion of each of the** plurality of optical lenses are exposed to ambient air respectively

Although not formally used in the rejection, but mentioned in the ***Response to Arguments*** in the June 8, 2007 Office Action, the Examiner also describes the embodiment of Figure 23 (reproduced below) of Sugama as anticipating the claims. Figure 23 illustrates another multilayer optical wiring substrate, which includes upper and lower waveguides 32 and 33 on opposing sides of a substrate 31. See paragraph [0202]. An optical via hole 34, within a groove 35 formed in the substrate 31, is provided between the two waveguides 32 and 33 in the substrate 31. A spherical lens 36, which acts as an optical condenser, is disposed within the via hole 34 above the groove 35. The purpose of the groove 35, which is filled with air or a liquid, is to relieve pressure in the optical hole 34. See paragraphs [0204] and [0214].

FIG. 23



The lens 36 is provided in the hole 34, above groove 35 and between the upper and lower waveguides. Accordingly, in the embodiments illustrated in Figure 23 of Sugama, there are no (i) **plurality of optical lenses formed on the bottom cladding layer**. The top cladding layer of Sugama is therefore **not** patterned so that a substantial portion of each of the plurality of optical lenses is exposed to ambient air respectively.

Claim 12 of the present invention is directed to a core channel having a **curved section** which follows a curved path and a **top cladding layer that is patterned to expose the curved section of the underlying core to ambient air**. In the rejection, the Examiner indicated that Figures14 of Sugama anticipates the claim.

In paragraph [0173], Sugama states that a description of Figure 14 is omitted because it is the same as Figure 13. An explanation of Figure 13 is therefore provided. For convenience, both Figures 13 and 14 are reproduced below. Beginning with paragraph [0170], Sugama describes an optical wiring multi-layer substrate as illustrated in Figure 13 with input optical wires 12 formed in a ***lower*** layer and output optical wires formed in an ***upper*** layer. In Paragraph [0171], Sugama

further teaches that the input wiring 12 and the output wiring 13 are "***linear***" (i.e., not curved) and are "***orthogonal to each other on different layers***". In paragraph [0174], Sugama teaches that an "***interlayer optical transfer portion 16***" or "***optical via hole 16***" is provided between the input wiring 12 and the output wiring 13 to optically couple the two together.

FIG. 13

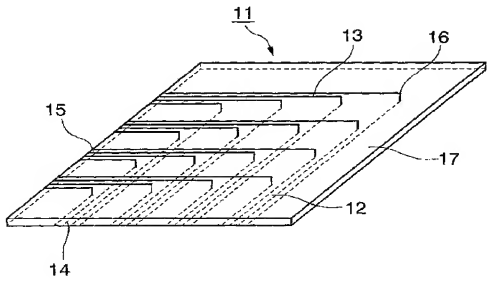
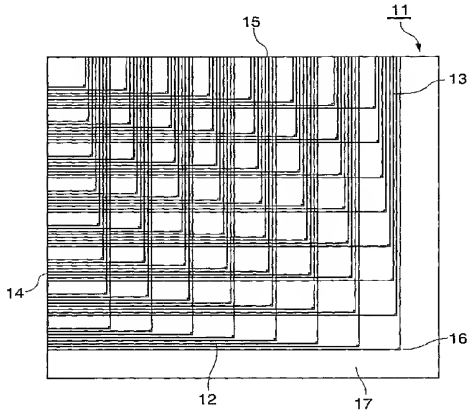


FIG. 14



As clearly described and illustrated in Sugama, the optical wires 12 and 13 (i.e., cores) are: (i) ***linear***; (ii) ***orthogonal*** to one another; and (iii) ***provided on different layers***.

In paragraph [0174], Sugama teaches that the optical transfer portion 16 or "via hole" 16 is described with regard to Figures 15 and 16A-16H. As noted above, Figure 15 is described by Sugama in paragraphs [0175] through [0177]. In paragraph [0175], Figure 15 is described as a cross-sectional view of an upper waveguide and a lower waveguide. The two waveguides are "orthogonal" (i.e., at right angles or 90 degrees apart) from one another. In paragraph [0177], Sugama describes the optical hole 16 as comprising the grooves 20 of the upper and lower waveguides, each covered with a reflective metal film 25. Again, as illustrated in Figure 15, the cores 23 (i.e. the wires 12 and 13 of Figures 13 and 14) are (i) ***on different layers or levels*** with respect to one another; (ii) ***linear***; (iii) ***orthogonal*** with respect to one another; and (iv) communicate with one another ***via the optical hole 16***.

Accordingly, in no way does Sugama teach that the cores 23 are: (i) **curved**. On the contrary, Sugama explicitly teaches that the upper and lower cores 23 (i.e., input wires 12 and output wires 13) are ***linear***. Furthermore, the cores 23 (or wires 12 and 13) are not exposed to **ambient air**. Sugama specifically teaches that the optical vias 16 are in the optical path between the upper and lower waveguides and are defined by the reflective surfaces 25 of the upper and lower waveguides respectively. Sugama therefore fails to teach or suggest the present invention as set forth in claim 12.

Lastly, the Applicant would like to address the Examiner's comments in the ***Response to Arguments*** in the June 8, 2007 Office Action. In the ***Response***, the Examiner relies on paragraph [0172] of Sugama which recites that the input wire 12 is "***perpendicularly bent***" at the interlayer optical transfer portion 16. As clearly explained above, the input wire 12 and the output wire 13 are linear, orthogonal with respect to one another, on different layers, and optically connected by an optical via hole 16. The term "bent" is therefore used by Sugama to mean that the input and output wires 12 and 13 are at right angles with respect to one another on different layers. It does not mean that the wires 12 and/or 13 are curved as the Examiner implies. Sugama explicitly teaches that the wires 12 and 13 are linear and not curved. The Examiner's interpretation of the term "bent" by Sugama is therefore misconstrued and improper.

In summary, Sugama fails to anticipate any of the claims of the present application. The Applicant believes that all pending claims are in a condition for allowance.

Respectfully submitted,
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